ESA-120 Final Public Report

Introduction:
The Atmore facility tufts, dyes and coats carpet for residential, contract and custom markets. The facility was built in 1968 by C.H. Masland & Sons. The facility has experienced continuous expansion over the last 37 years. The main steam use is in the Skein and Piece Dye departments, and in the steam heated dryers.

Objective of ESA:
The objective of the ESA was to find opportunities for improvement, evaluate their feasibility and establish priorities for their implementation.

Focus of Assessment:
Steam generation, distribution, usage and condensate return systems, and heat recovery.

Approach for ESA:
The approach for the ESA was to evaluate the existing condition of the steam system and establish a plan for improvement:
- evaluate and prioritize the list of projects in order to achieve the best effect of the improvements
- follow the best practices as recommended by DOE

General Observations of Potential Opportunities:
- Total plant natural gas cost for 2005 - $3,400,000
- Impact fuel cost - 11.53 $/MMBtu, impact electrical cost – 5.5 cents/kWh (2006) and/or 3.8 cents/kWh (if new electric boiler is installed
- Steam generation - at 100 psig, saturated, 24hr/5.25days/50 weeks. Average steam flow rate – 35,000 lbs/hr.

Near term opportunities – 10% savings – $350,000

- Decrease boiler blowdown rate
  The blowdown rate is controlled by the boiler water conductivity, which varies between 2500 and 4000 micromhos/cm. If the automatic blowdown valve is repaired or replaced, the BD levels can be increased by 0.3%, without affecting the quality of the boiler water. The payback is expected to be 1 year.

- Install blowdown flash and liquid heat recovery
  Currently the boiler blowdown discharge to an open flash tank. The flash steam is lost to the atmosphere and the liquid is mixed with cold water and discharged to the sewer. It is recommended to install a blowdown heat recovery vessel with a build-in coil. The flash steam vent will be routed to the deaerator to substitute some of the LP steam for deaeration and the heat from the liquid will be used to preheat the make-up water, before it goes to the deaerator. The payback is expected to be 1 year.

- Increase condensate recovery
  Currently the plant returns 20% of the condensate. Some of the steam is injected directly in the process and the condensate can not be returned, but the rest of the condensate is not returned due to bad piping practices, back pressure in pipes and malfunction of pumps. The plant will start a program for good piping practices, will repipe and build new condensate collection receivers and will return additionally 35% more from the present levels. The payback for this project is expected to be between 1 and 2 years.

- Steam trap losses maintenance program
  Eighty (80) steam traps are installed at the plant. The areas of higher concern are the skein becks and the drip traps on the distribution system. Many of the skein process traps discharge to the ground. Steam trap survey was performed this year. It is recommended to establish a good piping/sizing practices program and a maintenance program for the steam traps. The payback to apply the recommended repairs and replacements will be less than 2 years.

- Steam leaks maintenance program
  Multiple leaks were observed during the ESA. Some of the leaks are from pipes, gaskets and valve packings and are easy to repair. Others are due to the normal operational practices and will require repiping and new equipment installations in order to eliminate or reduce them. It is recommended to establish a steam leaks maintenance program. The payback to apply the recommended repairs and replacements will be less than 2 years.

- Improve pipework insulation
  The insulation is in a good condition in the boiler room, but there were areas around the plant, where the insulation was never installed or has deteriorated with the time and due to the wet environment. More than 2000 ft of bare piping was observed, large portion of which was on steam pipes. The payback to apply insulation on bare pipes or repair wet insulation will be less than 2 years.

Medium term opportunities – 20% savings

- Install heat recovery system to generate hot water (Reduce steam demand)
  The dyeing process requires certain amount of water to be used for each pound of dyed product. One third of the water is heated up to a set point and the rest is used for cooling. All of the water is discharged to a common pit, which has a mixed temperature, normally 25-35 degree F higher than the ambient water temperature. The heat from this warm water could be recovered to preheat the water used in the process and the make-up water in the boiler room. The proposed system could reduce the plant steam demand by more than 10%. The payback of the heat recovery system is expected to be around 2 years.

- Install electric boiler
  With the rise of the natural gas costs, the local utility offered special rates for power consumption during 9 months of the year (summer is excluded), if an electric boiler is installed. The payback of the electric boiler installation is expected to be around 2 years.

Long term opportunities – .5% savings

- Increase boiler efficiency – install combustion optimization system
  There is one boiler that is able to satisfy the plant steam demand by itself and it operates year-round. The fuel air ratio is controlled through a mechanical linkage system. The boiler is tuned once per year, but the boiler operators are capable of adjusting the settings, if needed. If a linkless system is installed, slightly lower excess air percents would be achieved and the boiler would improve its efficiency from the present levels. The payback of the combustion optimization system installation is expected to be more than 3 years.

Management Support and Comments:

The plant lead/contact person, Jason Stewart, and the participating in the ESA personnel, Kenny Barnhill and Jerry Young, provided full support before and during the ESA. They are dedicated to improve the steam system and all other utilities in the plant, and significantly to reduce the energy cost per unit of product. Their knowledge and understanding of the steam and other utility systems, as well as the data they provided, were very helpful for the ESA.

DOE Contact at Plant/Company: (who DOE would contact for follow-up regarding progress in implementing ESA results…)
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